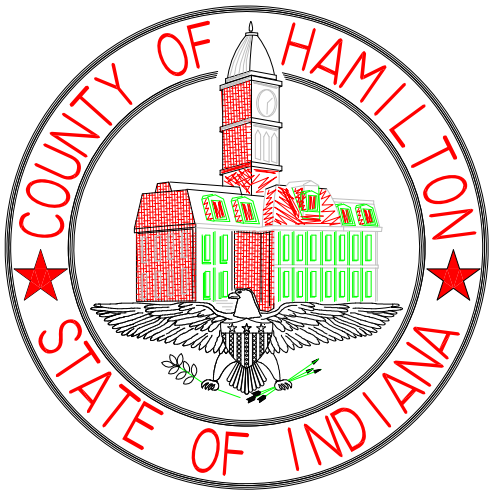
HAMILTON COUNTY
HIGHWAY DEPARTMENT



FIVE YEAR STRUCTURE IMPROVEMENT PROGRAM

2008 TO 2012

February 29, 2008

HAMILTON COUNTY
FIVE YEAR STRUCTURE IMPROVEMENT PROGRAM
2008 – 2012

PURPOSE AND SCOPE

The purpose of the "*Five Year Structure Improvement Program*" is to examine the inventory of information available for all bridges and small structures under the jurisdiction of Hamilton County, and formulate replacement, rehabilitation and maintenance strategies to improve bridges and small structures, optimizing the use of available funds.

Previous editions of the "*Hamilton County Five Year Bridge Management Plan*" addressed only "bridges" as defined by the National Bridge Inspection Standards (basically, structures greater than 20' in span). This program will include "small structures" – those structures less than 20 feet in span – as well. This is done to ensure that funds are prioritized to address the most critical structures first, regardless of size.

METHODOLOGY

The first step in creating this program was to assemble data regarding the condition of Hamilton County's bridges and small structures. Primary sources of data include the following:

- *Hamilton County Bridge Inventory, Rating and Safety Inspection, Phase II (2007)*: This report includes geometric and traffic data for each bridge, along with condition appraisals for various elements of the bridge, which are summarized as an overall sufficiency rating. The report also includes recommended schedules for repair, rehabilitation and replacement of bridges.

- *Hamilton County Small Structure Inventory, Rating and Safety Inspection (2006)*: This report addresses small structures, providing information similar to the Bridge Inventory report.

Data obtained from these sources was used to identify candidate projects for repairs, rehabilitations and replacements. Candidate structures in each category were then prioritized. Prioritization was based on a number of factors, including Sufficiency Rating, Structural Deficiency/Functional Obsolescence, load capacity and traffic volume.

Once candidate projects had been prioritized, the cost for various phases of each project was estimated. The cost projections, along with the criteria used to determine them, appear in Appendix B. These rough projected costs are for budgetary purposes; the actual cost for each project will vary depending on the specific requirements of each site at the time the work is undertaken.

BUDGET CONSIDERATIONS

In the past, most bridge projects in Hamilton County were funded by the Cumulative Bridge Fund. Small structure projects were generally funded by County Option Income Tax (COIT). Since the repeal of the Cumulative Bridge Fund in 2005, the primary source of funding for bridge projects has been the Cumulative Capital Development Fund (CCD). This program assumes that CCD will continue to be the primary funding source for bridges. For small structures, it is assumed that funding will be provided by CCD and/or COIT.

The projected budget for this program was developed assuming that funding levels will remain relatively constant over the next five years. The approved 2008 budget consists of $3,000,000 from CCD and $700,000 from COIT. The actual budget for each year may vary depending on tax revenues and expenditures on other projects out of the source funds. This program must remain somewhat flexible to adapt to slight variations in available funds. If there are significant changes in available funds, this program should be revised to reflect those changes.

Federal funds are available for bridge inventory and inspection, bridge replacement and bridge rehabilitation. In order to be eligible to receive federal bridge funds, a bridge must meet certain requirements. INDOT maintains a list of eligible bridges, which has been consulted in the development of this program. Bridges approved for Federal Aid generally receive 80% federal funding for construction and construction inspection. Bridges designated "FHWA" under the column "Funding Type" in Appendix A are anticipated to receive federal funding. Federal funds can only be applied to bridges; structures less than 20 feet in span are not eligible.

EXCEPTIONS TO THIS PROGRAM

In the normal course of highway business, there will likely be bridges constructed, repaired or replaced over the next five years which are not included in this program. Examples of these projects include the following:

- *Structures built as part of a larger road project*: These structures are generally included in the budget for the larger project.

- *Structures built with private funds*: Structures installed as part of a development are generally paid for by the developer, and accepted by Hamilton County upon completion.
- *Major Bridges*: Bridges which are 200 feet or greater in span are generally funded by the Major Bridge Fund, and are considered separately from this program.
- *Projects by outside agencies*: When a project by another agency affects a Hamilton County bridge, that agency generally funds the bridge work, unless an Interlocal Agreement specifies differently.

RECOMMENDATION

The recommended actions for this program are summarized in Appendix A, which includes a table summarizing costs for all aspects of the Structure Improvement Program over the next five years, along with detailed prioritization sheets for bridges and small structures.

The Hamilton County Highway Department believes that the implementation of this program will keep Hamilton County's bridges and small structures in the best condition possible, helping to achieve Hamilton County's goal of providing outstanding transportation systems to its citizens. Therefore, we recommend that the Hamilton County Board of Commissioners accept this program, and the Hamilton County Council do everything possible to provide the necessary funding to execute it.

Respectfully submitted,
Hamilton County Highway Department

Bradley Davis, Director of Highways

James W. Neal, Highway Engineer

Matthew T. Knight, Bridge Program Engineer

Faraz J. Khan, Staff Engineer, Bridge

APPENDIX A

HAMILTON COUNTY

Five Year Structure Improvement Program

COST SUMMARY

PROGRAM DESCRIPTION	2008	2009	2010	2011	2012
Bridge Replacements & Rehabilitations	$3,000,000	$1,880,000	$2,010,000	$2,010,000	$1,720,000
Small Structure Replacements	$1,550,000	$1,520,000	$1,555,000	$1,450,000	$1,455,000
Bridge Routine Maintenance & Minor Repairs	$200,000	$200,000	$250,000	$250,000	$300,000
Small Structure In-House Replacements & Repairs	$50,000	$50,000	$50,000	$50,000	$75,000
Bridge Inventory & Inspection	$0	$200,000	$0	$0	$0
Small Structure Inventory & Inspection	$0	$0	$0	$100,000	$0
TOTAL PROGRAM COST	**$4,800,000**	**$3,850,000**	**$3,865,000**	**$3,760,000**	**$3,550,000**

HAMILTON COUNTY

Five Year Structure Improvement Program

2008 - 2012

BRIDGES

BRIDGE NUMBER	LOCATION	PROJECT SCOPE	MAP GRID	2007 SUFFICIENCY RATING	FUNDING TYPE	2008	2009	2010	2011	2012
133	186th Street / Stoney Creek	Replacement	R-11	16.8	FHWA	(P.E. - 2005) $260,000				
68	281st Street / Duck Creek	Replacement	U-2	32.5	FHWA	(P.E. - 2005) $280,000				
236	101st Street / Flatrock Creek	Replacement	U-20	72.6	LOCAL	$1,000,000				
147	161st Street / Cool Creek	Replacement	G-14	42.2	FHWA	(P.E. - 2006)	$100,000	$600,000		
19	256th Street / Teter Br. Little Cicero	Replacement	E-4	49.4	LOCAL	(P.E. - 2007) $30,000	$500,000			
23	Joliet Road / Br. Little Eagle Creek	Replacement	A-12	72.6	LOCAL	(P.E. - 2007) $30,000	$480,000			
57	256th Street / Little Cicero Creek	Minor Rehabilitation	L-5	91.4	LOCAL	$400,000				
224	Allisonville Road / Stony Creek	Deck Replacement	N-14	79.3	LOCAL	$650,000				
180	121st Street / Sand Creek	Widening / Rehabilitation	O-18	77.6	LOCAL	$60,000	$30,000	$450,000		
174	Atlantic Avenue / Mud Creek	Replacement	U-15	34.3	FHWA	$180,000		$50,000	$320,000	
254	281st Street / W. Fork Bear Creek	Replacement	R-2	79.4	LOCAL	$110,000		$30,000	$460,000	
611	Cumberland Road / White River	Rehabilitation	N-10	96.7	LOCAL		$140,000	$900,000		
201	236th Street / Jay Ditch	Replacement	D-6	82.3	LOCAL		$130,000	$50,000	$550,000	
165	96th Street / Mud Creek	Minor Rehabilitation	N-20	94.0	LOCAL		$50,000	$200,000		
252	Allisonville Road / Shoemaker Ditch	Minor Rehabilitation	L-17	77.9	LOCAL			$50,000	$200,000	
124	Strawtown Avenue / Dyers Creek	Widening / Rehabilitation	T-7	82.7	LOCAL			$60,000	$30,000	$280,000
184	Brooks School Road / Mud Creek	Minor Rehabilitation	Q-18	89.9	LOCAL			$70,000	$30,000	$350,000
261	106th Street / Cheeney Creek	Replacement	L-19	74.4	LOCAL				$140,000	$50,000
164	Cumberland Road / Mud Creek	Minor Rehabilitation	N-20	79.4	LOCAL				$70,000	$300,000
58	Joliet Road / Br. Little Eagle Creek	Replacement	A-14	85.2	LOCAL				$120,000	$30,000
154	126th Street / Cool Creek	Minor Rehabilitation	H-17	94.2	LOCAL				$90,000	$350,000
151	Cumberland Road / Stony Creek	Replacement	N-14	58.3	LOCAL					$240,000
162	Cumberland Road / Sand Creek	Widening / Rehabilitation	N-19	75.7	LOCAL					$60,000
163	Cumberland Road / Sand Creek	Widening / Rehabilitation	N-19	76.7	LOCAL					$60,000
ANNUAL PROJECTED EXPENDITURES:						*$3,000,000*	*$1,880,000*	*$2,010,000*	*$2,010,000*	*$1,720,000*
NUMBER OF BRIDGES - ENGINEERING BEGINS IN THIS YEAR:						*3*	*3*	*3*	*4*	*3*
NUMBER OF BRIDGES - CONSTRUCTION BEGINS IN THIS YEAR:						*5*	*3*	*3*	*4*	*4*

L E G E N D:

	Design Engineering & Right of Way for Locally Funded Projects
	Design Engineering & Right of Way for Federally Funded Projects
	Land Acquisition
	Construction & Construction Inspection

HAMILTON COUNTY
Five Year Structure Improvement Program
2008 - 2012

SMALL STRUCTURES

STRUCTURE NUMBER	LOCATION	MAP GRID	2006 SUFFICIENCY RATING	2008	2009	2010	2011	2012
33010	246th Street / Sugar Run Creek	O-5	18.1	$25,000 / $400,000				
32011	231st Street / Bear Slide Creek	K-7	18.6	$0 / $500,000				
33063	Fall Road / Sugar Run Creek	O-6	65.0	$400,000				
31002	216th Street / Finley Creek	C-8	27.9	$25,000	$400,000			
33025	291st Street / Bear Creek	S-1	22.9	$10,000	$400,000			
33027	291st Street / W. Fork Bear Creek	R-1	33.9	$10,000	$400,000			
32072	Hinkle Road / Br. Hinkle Creek	H-8	30.9	$50,000	$50,000	$325,000		
31022	256th Street / Ross Ditch	E-4	28.9	$40,000	$40,000	$325,000		
32084	Schulley Road / J.H. Leap Ditch	K-8	34.8	$50,000	$40,000	$350,000		
32002	216th Street / J. Owen Drain	K-8	48.3	$40,000	$40,000	$350,000		
31053	Jerkwater Road / Boyer Ditch	A-1	42.1		$50,000	$25,000	$450,000	
31051	Jerkwater Road / McKinzie Ditch	A-4	33.0		$50,000	$25,000	$450,000	
23014	181st Street / Unknown Stream	Q-12	31.2		$50,000	$25,000	$300,000	
32081	Scherer Avenue / Scherer Drain	M-5	44.7			$50,000	$25,000	$300,000
33050	Lacy Road / Long Branch	P-3	49.9			$40,000	$35,000	$300,000
33019	266th Street / Long Branch	P-3	63.2			$40,000	$35,000	$300,000
32022	241st Street / Armstrong Drain	L-6	47.5				$40,000 / $25,000	$300,000
31056	Lamong Road / Hinesley Drain	B-5	45.2				$50,000	$25,000
33013	246th Street / Long Branch	Q-5	59.9				$40,000	$35,000
31078	Boxley Road / Teter Branch	E-4	53.8					$60,000 / $35,000
21005	156th Street / Unknown Stream	A-14	45.3					$50,000
21026	Kinsey Avenue / Grassy Branch	E-12	45.5					$50,000
ANNUAL PROJECTED EXPENDITURES:				$1,550,000	$1,520,000	$1,555,000	$1,450,000	$1,455,000
NUMBER OF STRUCTURES - ENGINEERING BEGINS IN THIS YEAR:				4	3	3	3	3
NUMBER OF STRUCTURES - CONSTRUCTION BEGINS IN THIS YEAR:				3	3	4	3	4

LEGEND:

	Design Engineering & Right of Way
	Land Acquisition
	Construction and Construction Inspection

APPENDIX B

COST PROJECTION CRITERIA

Project costs were estimated based on historical averages from past projects with similar scopes of work. The following guidelines were followed in determining the cost estimates:

BRIDGE REPLACEMENTS

1. Proposed bridge lengths were estimated by multiplying the existing bridge length by a factor as follows:

Existing Bridge Length	Proposed Bridge Length
< 40 feet	2.00 x (existing bridge length)
≥ 40 feet, ≤ 60 feet	1.50 x (existing bridge length)
>60 feet	1.35 x (existing bridge length)

2. Proposed bridge widths were estimated based on the projected future use of the roadway as follows:

Roadway Use	Proposed Bridge Width
2 lanes, no pedestrian paths	35 feet
2 lanes with pedestrian paths	45 feet
4 lanes with pedestrian paths	75 feet

3. Proposed Bridge Length was multiplied by Proposed Bridge Width to determine the Proposed Bridge Deck Area in square feet. Proposed Bridge Deck Area was multiplied by $100 per square foot to determine the Replacement Bridge Cost.

4. Proposed roadway approach lengths were determined as follows:

   Locally Funded Project: 800 feet
   Federally Funded Project: 1600 feet

5. Proposed roadway approach length was multiplied by $300 per foot to determine the Roadway Reconstruction Cost.

6. The above figures were adjusted based on engineering judgment, considering any irregular site conditions.

7. Total Construction Cost (in the base year 2006) was determined by adding the Replacement Bridge Cost and the Roadway Reconstruction Cost.

8. The costs for design engineering and right-of-way services were estimated based on percentages of the Total Construction Cost, as follows:

Phase	Locally Funded Project	Federally Funded Project
Design Engineering	15%	17%
Right-of-Way Engineering & Services	5%	6%
Construction Inspection	5%	15%
Total	**25%**	**38%**

9. Land acquisition costs were estimated based on the location of the project. Generally, land acquisition in Clay, Delaware, Fall Creek, Washington, Noblesville and Wayne Townships was estimated at $50,000 - $75,000. Land acquisition in Adams, Jackson and White River Townships was estimated at $25,000 - $50,000.

10. An inflation factor of 3% per year was applied to adjust costs to the projected year in which each phase would be completed.

11. In the event that more reliable cost data was available (e.g., itemized estimate), that cost was used in lieu of the projected cost as determined by the criteria above.

BRIDGE REHABILITATIONS

Bridge rehabilitations tend to vary widely in scope, which makes estimating the cost for these projects more difficult. There is little historical data upon which to base estimated costs, but there is some basis to estimate the construction cost for the following types of projects:

- Concrete bridge deck overlay projects were estimated based on $60 per square foot of existing bridge deck area, and $130 per foot of approach roadway resurface. Length of approach roadway resurface was estimated based on the specific conditions at each site.

- Timber bridge deck widening was estimated based on $200 per square foot of existing bridge deck area, and $130 per foot of approach roadway resurface.

For any scope of work other than the above, engineering judgment was used in estimating project costs.

HAMILTON COUNTY
Five Year Structure Improvement Program
2008 - 2012

Replacement Cost Projections (Base Year 2006)

Bridge No.	Location	Funding Source	Existing Bridge Length (ft)	Repl. Bridge Length (ft)	Repl. Bridge Width (ft)	Roadway Reconstr. Length (ft)	Replacement Bridge Cost	Roadway Reconstr. Cost	Total Construction Cost	PE, RWE, RWA Cost	Construction Inspection Cost	Land Acquisition Cost	Total Project Cost
19	256th St. / Teter Br. Little Cicero Creek	Local	32	64	35	800	$224,000	$240,000	$464,000	$92,800	$23,200	$25,000	$605,000
23	Joliet Rd. / Br. Little Eagle Creek	Local	28	56	35	800	$196,000	$240,000	$436,000	$87,200	$21,800	$25,000	$570,000
58	Joliet Rd. / Johnson & Gardner Drain	Local	25	50	35	800	$175,000	$240,000	$415,000	$83,000	$20,750	$50,000	$568,750
68	281st St. / Duck Creek	FHWA	60	90	35	1600	$315,000	$480,000	$795,000	$182,850	$119,250	$50,000	$1,147,100
133	186th St. / Stony Creek	FHWA	57	85.5	35	1600	$299,250	$480,000	$779,250	$179,228	$116,888	$50,000	$1,125,365
147	161st St. / Cool Creek	FHWA	34	68	75	1600	$510,000	$480,000	$990,000	$227,700	$148,500	$75,000	$1,441,200
151	Cumberland Rd. / Stony Creek	Local	73	98.6	45	1200	$443,475	$360,000	$803,475	$160,695	$40,174	$100,000	$1,104,344
174	Atlantic Ave. / Mud Creek	FHWA	64	86.4	35	1600	$302,400	$480,000	$782,400	$179,952	$117,360	$50,000	$1,129,712
201	236th St. / Elijah Jay Drain	Local	26	52	45	800	$234,000	$240,000	$474,000	$94,800	$23,700	$50,000	$642,500
236	101st St. / Flatfork Creek	Local	29	58	45	800	$261,000	$240,000	$501,000	$100,200	$25,050	$50,000	$676,250
254	281st St. / W. Fork Bear Creek	Local	24	48	35	800	$168,000	$240,000	$408,000	$81,600	$20,400	$25,000	$535,000
261	106th St. / Shoemaker Ditch	Local	26	52	45	800	$234,000	$240,000	$474,000	$94,800	$23,700	$50,000	$642,500

Bridge Deck Overlay Cost Projections (Base Year 2006)

Bridge No.	Location	Funding Source		Bridge Length (ft)	Bridge Width (ft)	Roadway Resurface Length (ft)	Bridge Rehab. Cost	Roadway Resurface Cost	Total Construction Cost	PE, RWE, RWA Cost	Construction Inspection Cost	Land Acquisition Cost	Total Project Cost
57	256th St. / Little Cicero Creek	Local		168	28	200	$282,240	$26,000	$308,240	$61,648	$15,412	$0	$385,300
154	126th St. / Cool Creek	Local		133	32	400	$255,360	$52,000	$307,360	$61,472	$15,368	$0	$384,200
164	Cumberland Rd. / Mud Creek	Local		95	26	400	$148,200	$52,000	$200,200	$40,040	$10,010	$0	$250,250
184	Brooks School Rd. / Mud Creek	Local		84	28	400	$235,200	$52,000	$287,200	$57,440	$14,360	$30,000	$389,000
611	Cumberland Rd. / White River	Local		391	34.5	400	$741,923	$52,000	$793,923	$119,088	$39,696	$0	$952,707

Timber Bridge Widening Cost Projections (Base Year 2006)

Bridge No.	Location	Funding Source		Bridge Length (ft)	Bridge Width (ft)	Roadway Resurface Length (ft)	Bridge Rehab. Cost	Roadway Resurface Cost	Total Construction Cost	PE, RWE, RWA Cost	Construction Inspection Cost	Land Acquisition Cost	Total Project Cost
124	Strawtown Ave. / Dyers Creek	Local		34	26.2	400	$178,160	$52,000	$230,160	$46,032	$11,508	$25,000	$312,700
148	161st St. / Kirkendall Creek	Local		36	26.6	400	$191,520	$52,000	$243,520	$48,704	$12,176	$25,000	$329,400
162	Cumberland Rd. / Sand Creek	Local		36	26	400	$187,200	$52,000	$239,200	$47,840	$11,960	$25,000	$324,000
163	Cumberland Rd. / Sand Creek	Local		40	26	400	$208,000	$52,000	$260,000	$52,000	$13,000	$25,000	$350,000
613	Gray Rd. / Kirkendall Creek	Local		26	26	0	$135,200	$0	$135,200	$27,040	$6,760	$0	$169,000

Bridge Superstructure Widening Cost Projections (Base Year 2006)

Bridge No.	Location	Funding Source	Bridge Length (ft)	Existing Bridge Width (ft)	Proposed Bridge Width (ft)	Bridge Widening Area (sft)	Bridge Rehab. Cost	Roadway Reconstr. Cost	Total Construction Cost	PE, RWE, RWA Cost	Construction Inspection Cost	Land Acquisition Cost	Total Project Cost
180	121st St. / Sand Creek	Local	58	22	45	1334	$300,150	$120,000	$420,150	$84,030	$21,008	$25,000	$550,188